sustainable development and water ...

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water ...

“Except for floods and drought, we ignore water. For over a generation most North Americans have seldom had to think about it. It comes to our taps when called. It drains away to somewhere else.... Like good health, we ignore water when we have it. But like health, when water is threatened, it's the only thing that matters.... Where there is no water, there is no life... We live by the grace of water.”

National Geographic Special Edition, November 1993

conventional design ...

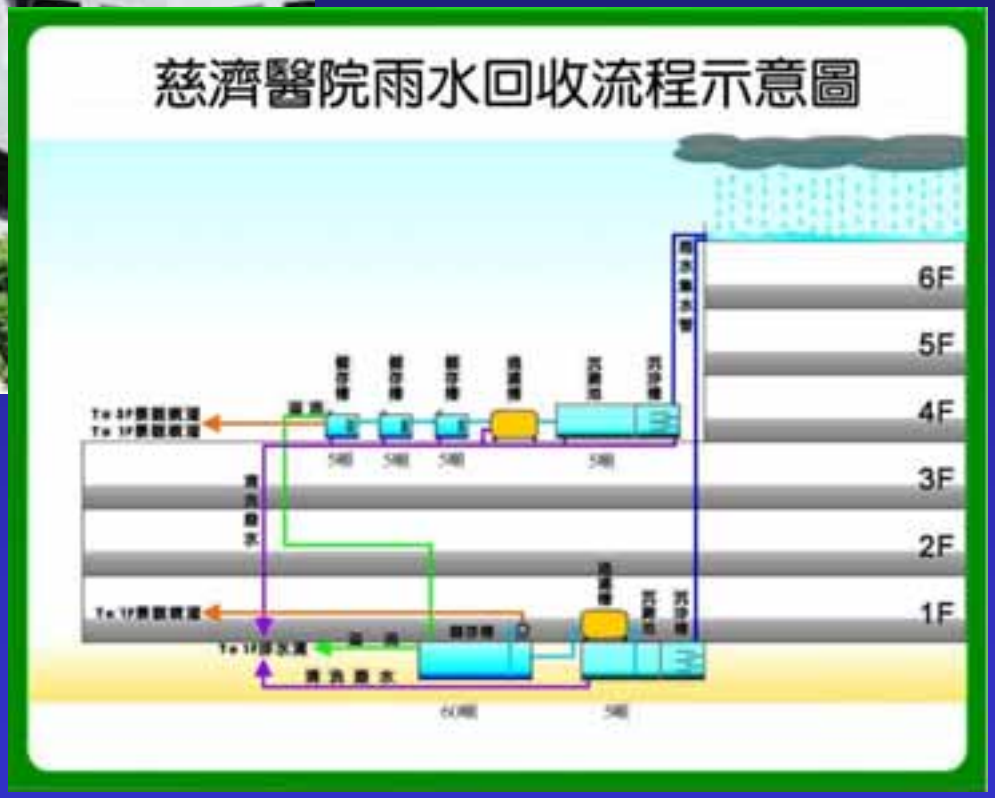
not new technology ...

vernacular expressions ...

international examples ...

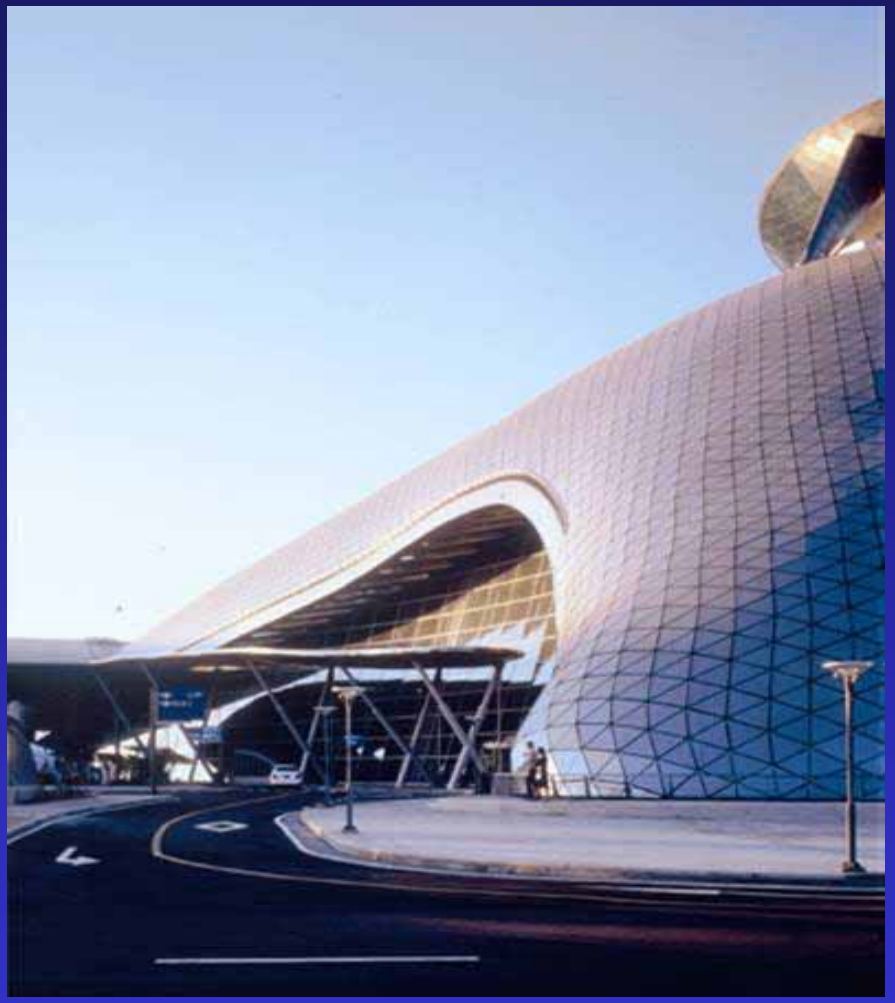
Potsdamer Platz – Berlin, Germany

Photo Courtesy Atelier Dreiseitl



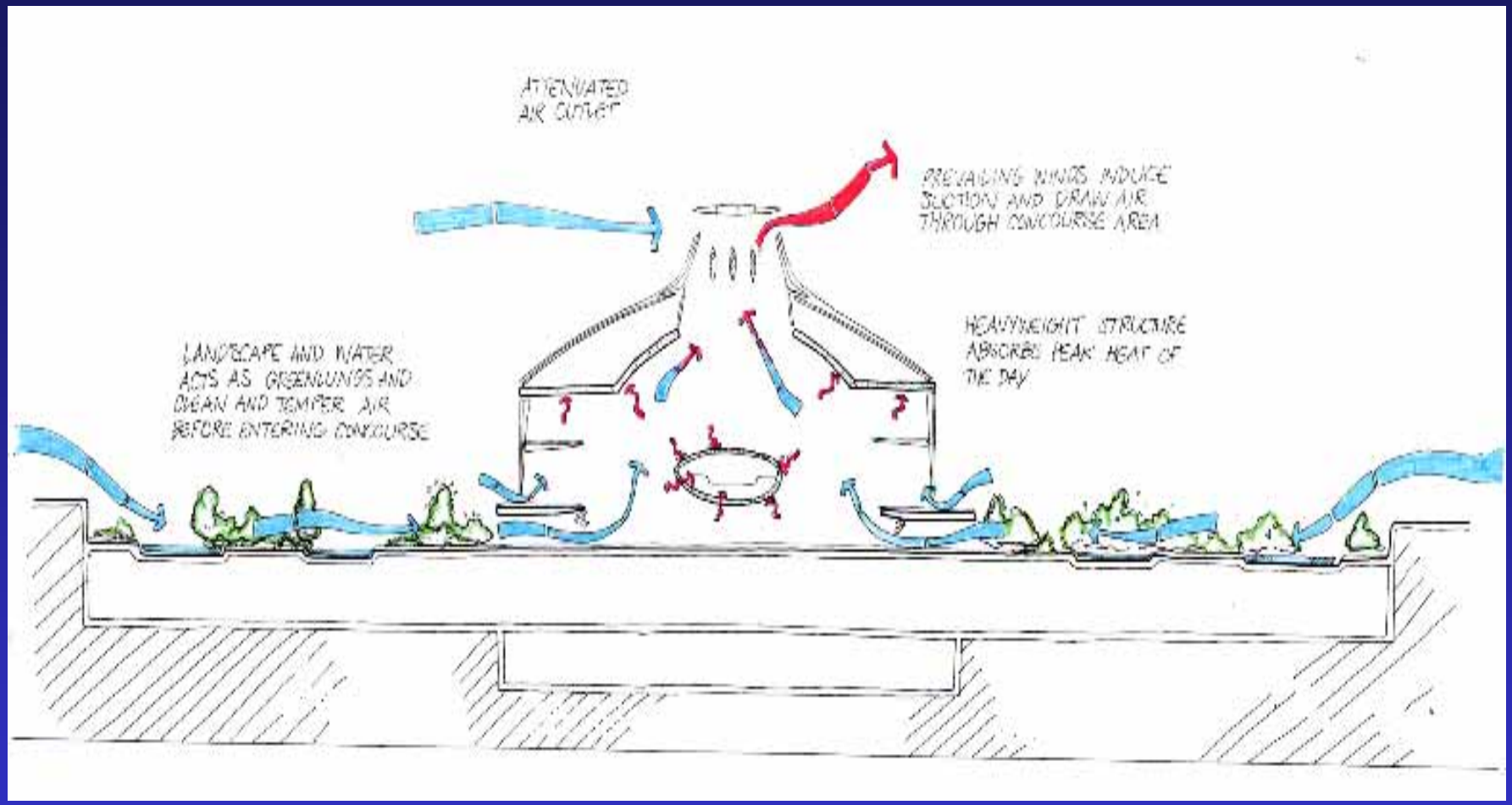
Tzu Chi Hospital - Hualien, Taiwan

Photo Courtesy SOM



Inchon International Airport - Seoul, Korea

Photo Courtesy Battle McCarthy



Inchon International Airport – Ventilation Strategy

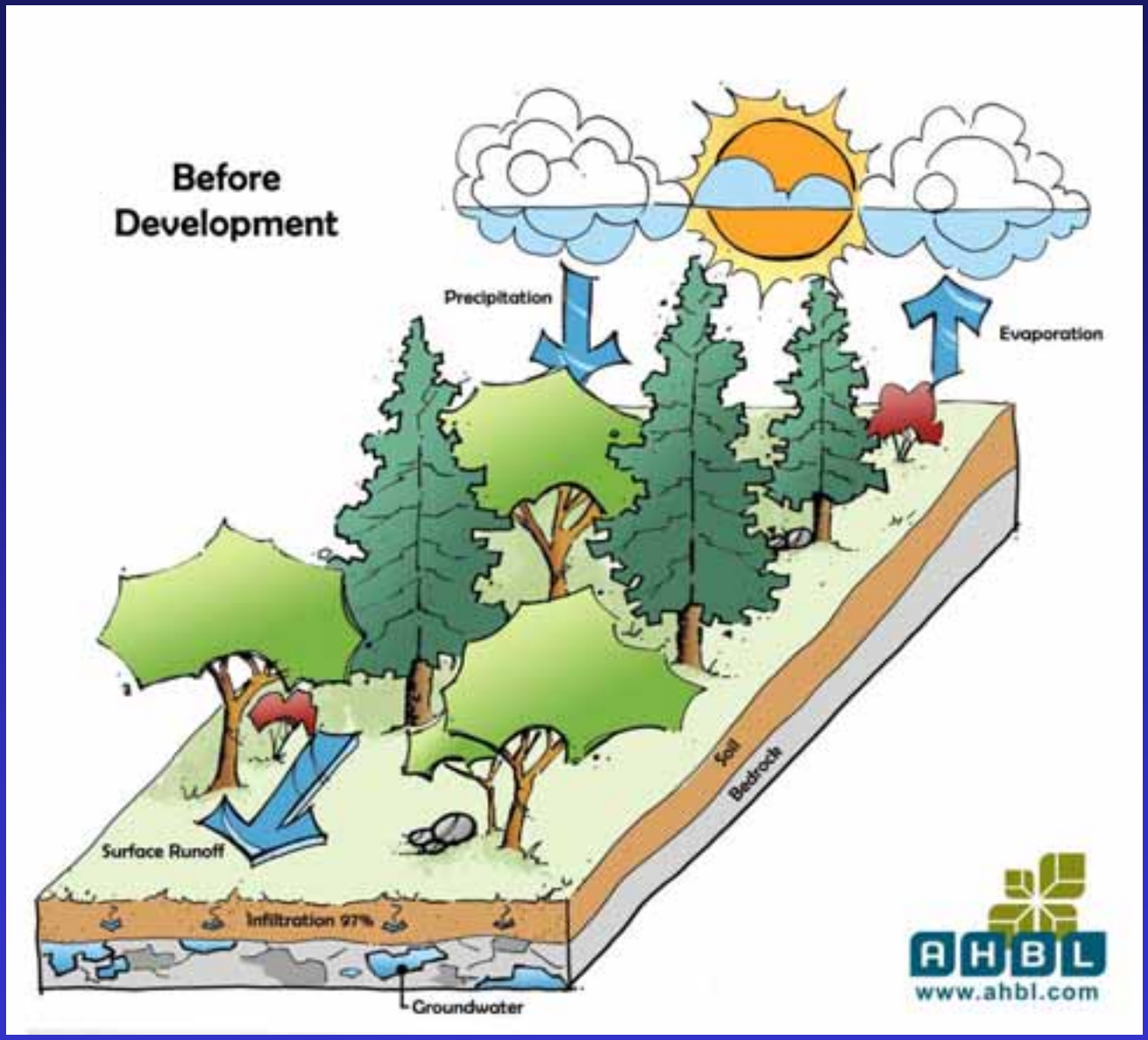
Illustration Courtesy Battle McCarthy

low impact development

LID is a comprehensive land development approach and stormwater management strategy that uses hydrology as the integrating framework for design in order to achieve a “high performance” site for water and energy efficiency.

LID manages water – both rainfall and stormwater runoff – at its source by directing stormwater toward small-scale, distributed controls and uses impervious and permeable surfaces (buildings, parking lots, roofs, open space) to manage, collect, reuse, and protect natural resources.

The LID technologies alter the volume and rate of stormwater runoff, filter pollutants, and increase groundwater recharge. The devices are integrated with the infrastructure, architecture and landscape in order to create a balanced, hydrologically functional and sustainable site.


Before Development
Precipitation
Evaporation
Surface Runoff
Infiltration 97%
Soil
Bedrock
Groundwater
AHBL
www.ahbl.com


Precipitation
Evaporation
Surface Runoff
Infiltration 3%
Soil
Bedrock
Groundwater
AHBL
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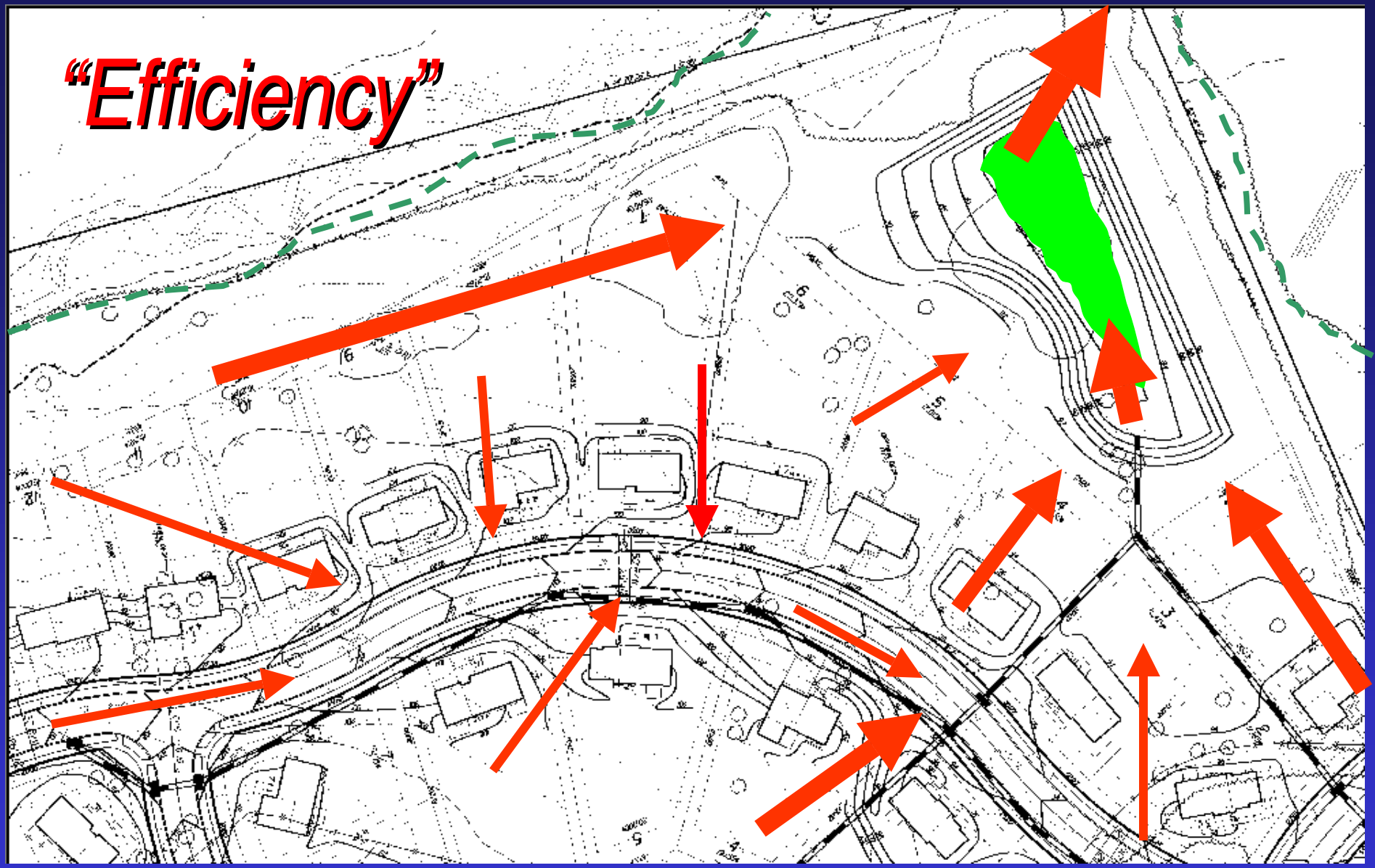

Conventional Pipe and Pond Centralized Control

Illustration Courtesy Prince Georges County, MD DER

LID Uniform Distribution of Micro Controls

Illustration Courtesy Prince Georges County, MD DER

Tacoma Narrows Bridge Office Building

Option 1 - L.I.D. version

L.I.D. Components:

- Manage storm water as close to source as possible
- Roof drainage directed to infiltration system
- Introduce pervious pavement (gravel in parking spaces)
- Parking drainage directed away from parking/driveways
- Eliminate underground pipes and catch basins
- Define open ditch flow path
- Storm water dispersal through forest
- Low impact foundation technology – gravel pods under buildings don't interrupt groundwater flow

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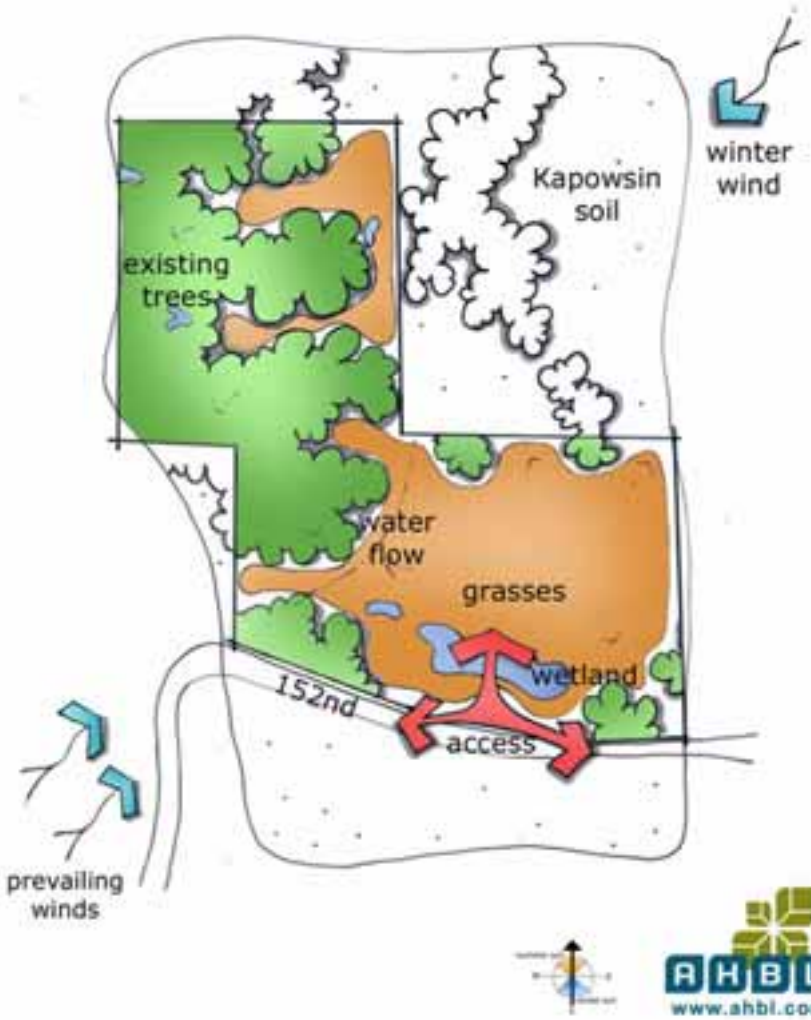
Pierce County

The Meadow on the Hylebos

Low Impact Development - Demonstration Project


winter
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trees
water
flow
grasses
wetland
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access
prevailing
winds
AHBL
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Master Plan
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LARGE LOT
LOW IMPACT SITE FEATURES

- PIN FOUNDATION TECHNOLOGY
- SPLASH BLOCKS
- RAINFALL REUSE (CISTERN)
- NATIVE TREE AND SHRUB PRESERVATION
- PERVIOUS OUTDOOR LIVING SPACES - DECKS/PATIOS
- PERVIOUS WALKWAYS AND DRIVEWAYS
- OPEN CONVEYANCE OF STORM WATER
- BIODETENTION/ RETENTION
  - RAIN GARDEN
  - BIO-SWALE

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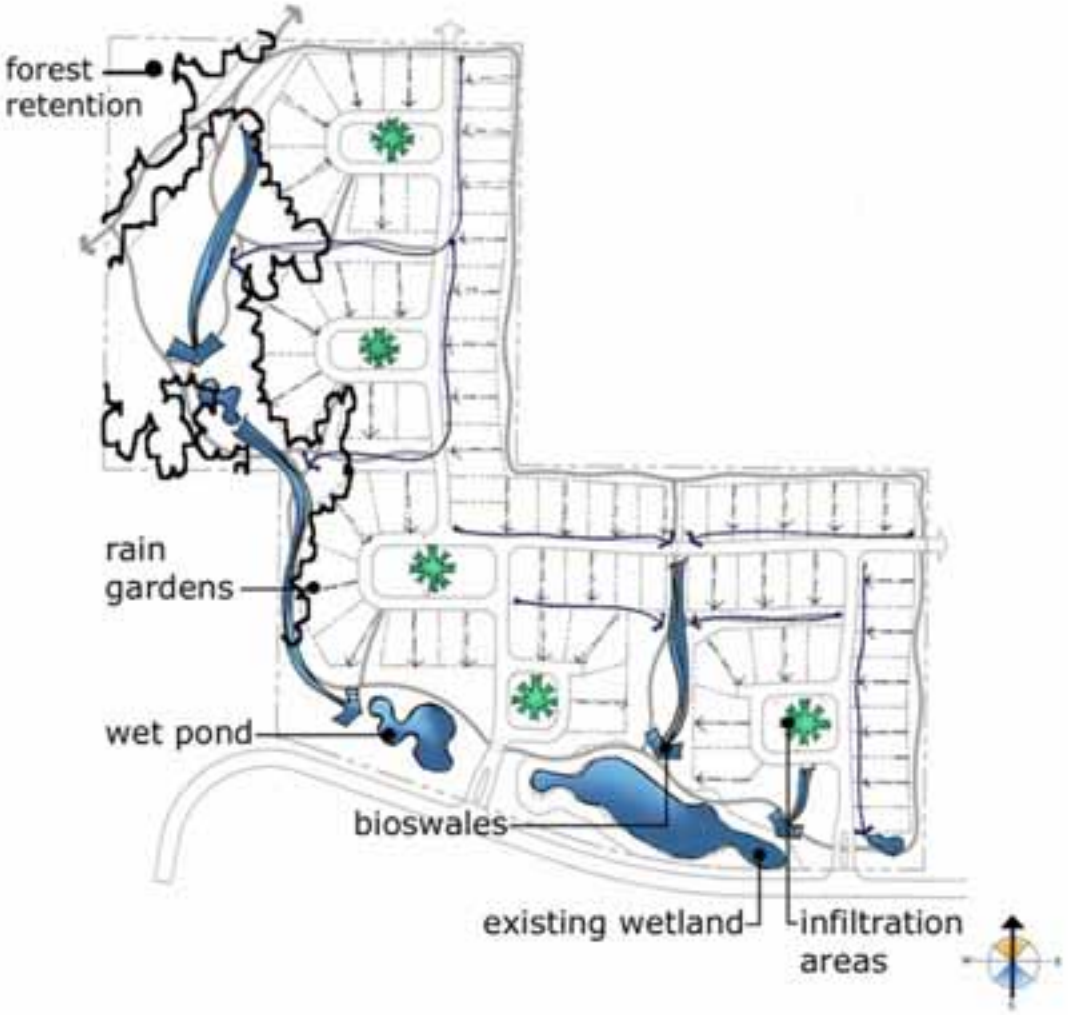

Drainage Concept

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LEED and LID

"High Performance" Building

LEED promotes that a building is a 'system' that can be designed and constructed to minimize environmental impact and optimize performance.

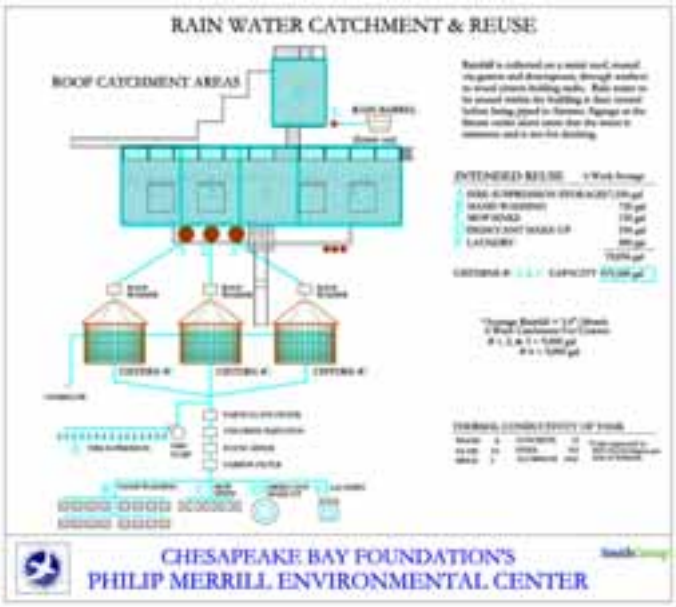

Photo Chesapeake Bay Foundation Headquarters, LEED Platinum

"High Performance" Site Development

Likewise a site should be designed as a 'system' that is integrated and interdependent.

The integrated Plan uses all surfaces – impervious and permeable – such as buildings, parking lots, roofs, open space to manage, collect, reuse, and protect natural resources.

The LID approach builds on LEED and develops a fully integrated "system" of site and structure.

Washington Navy Yard – Washington, DC

LID Center

OVERALL CONCEPT PLAN

LIST OF POTENTIAL PRACTICES

- BIORETENTION CELLS
- AMENDED SOILS
- STRUCTURAL TREE SOILS
- PERMEABLE PAVERS
- CISTERNS
- LOW MAINTENANCE NATIVE LANDSCAPING
- GREEN ROOF GRIDS
- GREEN ROOFS
- DRIP IRRIGATION
- LANDSCAPE CONTOURING
- SIDEWALK REGRADING
- HIGH EFFICIENCY IRRIGATION
- SOLAR POWERED FOUNTAIN
- INLET INSERTS
- RECYCLED PLANTER BOXES
- RECYCLED BENCHES
- DISCONNECT ROOF LEADERS
- TREE BOX FILTER
- DIVERT STORM DRAINAGE TO LANDSCAPE
- ALTERNATIVE PAVEMENT SURFACES
- EDUCATIONAL SIGNAGE AND EXHIBITS
- MONITORING DEVICES
- STORM DRAIN DIVERSION
- POLLUTION PREVENTION

GREENING EPA
Low Impact Development
Demonstration Projects

Greening EPA – Washington, DC

LID Center

for more information on LID

www.lowimpactdevelopment.org

"Achieving Sustainable Site Design through Low Impact Development Practices" @ http://www.wbdg.org/design/resource.php?cn=0&cx=0&rp=42

"Low Impact Development Technologies" @ www.wbdg.org (posting in May 2004)